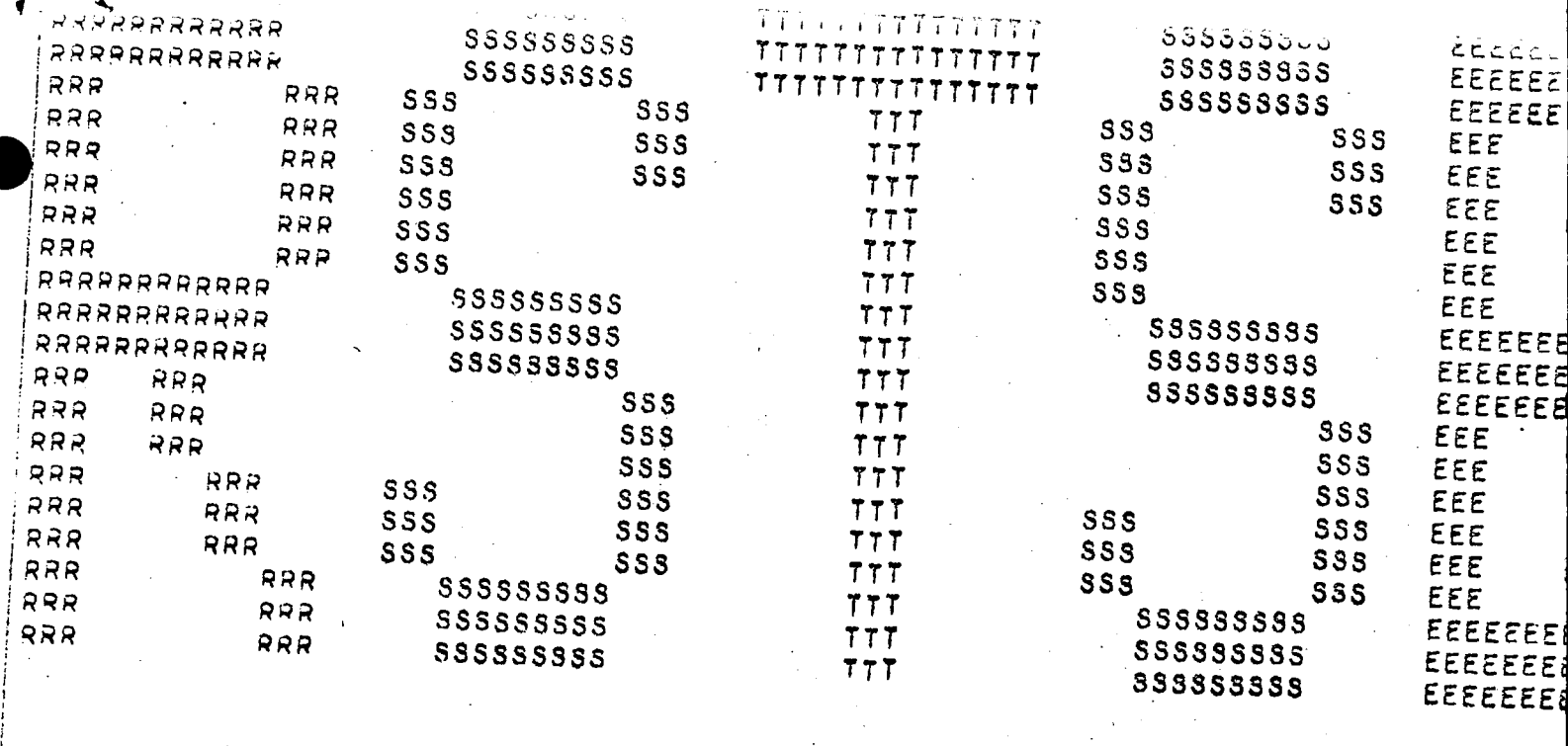

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TO: DISTRIBUTION

FROM: DAN HALLER
DEPT: M/L-11
LOC: 3-5 X4435
DATE: 20-AUG-74

SUBJ: NEW FEATURES OF RSTS/E V05B

THIS DOCUMENT IS AN ATTEMPT TO DESCRIBE BRIEFLY ALL THE NEW FEATURES OF RSTS/E V05B. THERE IS SOME NEW HARDWARE SUPPORT, MANY NEW SOFTWARE FEATURES, NEW BASIC-PLUS CUSPS, IMPROVED MANUALS, AND THE NEW 2780 PACKAGE. MANY BUGS HAVE BEEN FIXED. NEARLY EVERY PART OF THE SYSTEM HAS BEEN CHANGED IN SOME WAY. I WILL NOT ATTEMPT TO DESCRIBE EVERYTHING BUT WILL CONSIDER THE MAJOR VISIBLE CHANGES. WE HAVE PAID CLOSE ATTENTION TO QUALITY, DOCUMENTATION, AND HUMAN ENGINEERING FACTORS IN THE DEVELOPMENT OF RSTS/E V05B. THE RESULT IS A BETTER SYSTEM WHICH SHOULD REQUIRE LESS FIELD SUPPORT THAN ANY PREVIOUS RSTS SYSTEM.

1. NEW HARDWARE SUPPORTED

A. RS03/RS04 FIXED HEAD DISK SUPPORT

ANY COMBINATION OF UP TO FOUR RS03 AND/OR RS04 FIXED HEAD DISKS ARE SUPPORTED IN V05B FOR SWAPPING AND NON-RESIDENT CODE. THE TRANSFER RATE FOR THE RS03 IS 4 OR 8 USEC/WORD. TRANSFER RATE FOR THE RS04 IS 2 OR 4 USEC/WORD BUT ONLY THE 4 USEC RATE SHOULD BE USED. BOTH DEVICES HAVE AVERAGE ROTATIONAL LATENCY OF 8 MSECS. THE TRANSFER RATE OF THE OLDER RF11 IS 16 USECS/WORD AND AVERAGE ROTATIONAL LATENCY IS 17 MSEC. THE NET EFFECT OF USING RS03'S AND/OR RS04'S IS FASTER INTERACTIVE RESPONSE TIME AND BETTER OVERALL SYSTEM PERFORMANCE.

B. LP11R 1200 LPM LINE PRINTER SUPPORT

SUPPORT OF THE LP11R IS NO DIFFERENT FROM SUPPORT OF ANY LP11 PRINTER. CHANGES IN V05B AFFECT MAXIMUM PRINTER SPEED AND SYSTEM OVERHEAD FOR PRINTING. RSTS/E V05-21 WOULD RUN THE LP11R AT ONLY 800 LPM. A NEW PRINTER DRIVER AND NEW BUFFER MANAGEMENT SCHEME ALLOWS THE LP11R TO RUN AT FULL RATED SPEED OF 1200 LPM SUBJECT TO SOME DEGRADATION UNDER HEAVY SYSTEM LOAD.

C. 2741 TERMINAL SUPPORT

RSTS/E V05B SUPPORTS 2741 COMPATIBLE TERMINALS AS NORMAL TIME-SHARING TERMINALS. 2741'S ARE NON-ASCII HALF DUPLEX DEVICES. THEY PROVIDE UPPER AND LOWER CASE, SELECTRIC TYPEWRITER QUALITY COPY ESPECIALLY SUITED TO DOCUMENT PREPARATION AND SIMILAR APPLICATIONS. FOUR STANDARD CODE/KEYBOARD ARRANGEMENTS ARE SUPPORTED INCLUDING STANDARD CORRESPONDENCE, BINARY CODED DECIMAL (BCD), EXTENDED BINARY CODED DECIMAL (EBCD), AND CALL 360 BASIC CODE.

D. DL11C AND DL11D SUPPORT

THE ENTIRE LINE OF DL11 TERMINAL INTERFACES ARE SUPPORTED IN V05B. RSTS/E V05-21 SUPPORTED ONLY THE DL11A, DL11B, AND DL11E.

E. CD11 CARD READER SUPPORT

SUPPORT FOR THE HIGH SPEED CD11 CARD READERS WAS IN V05-21 BUT WAS NOT WELL PUBLICIZED. BOTH THE CD11-A (1000 CPM TABLE MODEL) AND CD11-EA (1200 CPM FREE STANDING MODEL) ARE SUPPORTED. UNDER V05B MAXIMUM CARD READING RATE IS APPROXIMATELY 800 CPM FOR BOTH MODELS. CR11 (200 CPM) AND CM11 (200 CPM MARK SENSE) READERS ARE STILL SUPPORTED.

II. NEW SYSTEM FEATURES AND ENHANCEMENTS

A. SYSTEM GENERATION

RSTS/E V05B SYSTEM GENERATION PROCEDURES ARE SIMILAR TO THOSE USED FOR V05-21. GENERATIONS ARE STILL PERFORMED UNDER A DOS/BATCH MONITOR. WE HAVE UPGRADED TO DOS/BATCH V09-20 TO AVOID PROBLEMS ASSOCIATED WITH PREVIOUS VERSIONS AND TO TAKE ADVANTAGE OF NEW LINKER CAPABILITIES.

DECPACK HAS BEEN ADDED AS A DISTRIBUTION MEDIA FOR V05B. THE SYSTEM WAS PREVIOUSLY AVAILABLE ONLY ON DECTAPE AND MAGTAPE.

THE SYSGEN PROGRAM HAS CHANGED CONSIDERABLY FROM THE PREVIOUS VERSION. THERE ARE APPROXIMATELY 25 NEW QUESTIONS RELATING TO THE NEW HARDWARE AND SOFTWARE OPTIONS. "KLUDGES" IN THE V05-21 SYSGEN WERE CLEANED UP. SYSGEN PROVIDES FOR AUTOMATIC INCLUSION OF THE 2780 PACKAGE IF CONFIGURED INTO THE RSTS/E SYSTEM. THE BATCH FILE GENERATED BY THE SYSGEN PROGRAM IS OPTIMIZED FOR THE DISTRIBUTION MEDIA BEING USED. THE NET RESULT IS THAT SYSTEM GENERATIONS ARE GENERALLY QUICKER DESPITE ADDED SYSTEM COMPLEXITY.

AN AUTO-ANSWER CAPABILITY HAS BEEN ADDED TO THE SYSGEN PROGRAM. AUTO-ANSWERS PROVIDE A HARDWARE CONFIGURATION CHECK FOR THE MACHINE. FOR EXAMPLE, SYSGEN WILL COUNT THE NUMBER OF EACH TYPE OF TERMINAL INTERFACE AND PRINT ITS FINDINGS AS ANSWERS TO THE SYSGEN QUESTIONS. THE USER MAY ACCEPT OR OVERRIDE THE AUTO-ANSWERS.

CHECKPOINTING HAS ALSO BEEN ADDED. SHOULD SOMETHING GO WRONG DURING SYSTEM GENERATION, THE PROCESS CAN BE RESUMED AT THE THE NEAREST CHECKPOINT THEREBY AVOIDING WASTED TIME AND EFFORT.

B. INITIALIZATION CODE

1. MULTIPLE SWAP FILES

THE REFRESH OPTION OF THE INITIALIZATION CODE PROVIDES FOR CREATION OF UP TO FOUR SWAP FILES. THIS PROVIDES A MEANS FOR HANDLING MULTIPLE RS03 AND/OR RS04 FIXED HEAD DISKS AND ALLOWS JOBS TO BE SWAPPED ON BOTH A SWAPPING DEVICE AND THE SYSTEM DISK. SYSTEMS CAN GET BY WITH LESS FAST SWAPPING SPACE SINCE JOBS WHICH OVERFLOW THE SPACE AVAILABLE ON THE SWAPPING DISK(S) CAN BE SWAPPED ON THE SYSTEM DISK.

C. MONITOR

1. SCHEDULER ENHANCEMENTS

SOME SCHEDULER ENHANCEMENTS WERE MADE IN V05B TO IMPROVE INTERACTIVE RESPONSE UNDER HEAVY SYSTEM LOAD. RELATED CHANGES IN THE JOB PRIORITY SCHEME TEMPORARILY ELEVATES A JOB'S PRIORITY WHEN A DELIMETER OR CONTROL/C IS TYPED.

2. NEW SWAP ALGORITHM

THE MONITOR SWAP ALGORITHMS WERE REWRITTEN TO HANDLE MULTIPLE SWAP FILES. SWAP "SLOTS" ARE DYNAMICALLY ALLOCATED TO TAKE BEST ADVANTAGE OF FAST AND SLOW SWAPPING DEVICES.

3. BUFFER MANAGEMENT CHANGES

IN RSTS/E V05B THE SMALL BUFFER MANAGEMENT ROUTINES WILL ALLOW CHARACTER ORIENTED DEVICES TO USE MORE SMALL BUFFERS THAN WAS ALLOWED UNDER THE V05-21 FIXED QUOTA SMALL BUFFER MANAGEMENT SCHEME. SMALL BUFFERS ARE SYSTEM RESOURCES WHICH WERE NOT USED EFFICIENTLY IN PREVIOUS SYSTEMS. THE NET EFFECT IS THAT JOBS WHICH PERFORM OUTPUT TO CHARACTER ORIENTED DEVICES (TERMINALS, LINE PRINTERS, ETC.) WILL NEED TO BE SWAPPED IN LESS FREQUENTLY SINCE THERE ARE FEWER STALLS DUE TO EXCEEDING A DEVICE QUOTA OF SMALL BUFFERS.

4. OPTIONAL RESIDENT CODE

IN RSTS/E V05-21 IT WAS POSSIBLE TO MAKE THE MOST COMMONLY USED DISK HANDLING CODE (OPEN, CLOSE, CREATE A FILE, ETC.) RESIDENT TO IMPROVE FILE PROCESSING PERFORMANCE. SEVERAL ADDITIONAL OVERLAY SEGMENTS CAN BE MADE PERMANENTLY RESIDENT IN V05B. THE SYS CALL DISPATCH ROUTINES AND TABLES, THE SEND/RECIEVE CODE, AND THE DIRECTORY LISTING OVERLAY SEGMENTS CAN ALL BE MADE PERMANENTLY RESIDENT AT SYSTEM GENERATION TIME.

2. TERMINAL SERVICE

1. MULTI-TTY

MULTI-TERMINAL SERVICE IS A NEW RSTS/E V05B OPTION. IT PERMITS A SINGLE BASIC-PLUS PROGRAM TO INTERACT WITH MANY TERMINALS. THE FEATURE IS WELL SUITED TO ORDER ENTRY AND QUERY/RESPONSE APPLICATIONS WHERE IT IS IMPRACTICAL OR AT LEAST INEFFICIENT TO HAVE SEPARATE JOBS TO SERVICE TERMINALS WHICH PERFORM ESSENTIALLY IDENTICAL REPETITIVE FUNCTIONS. IN PREVIOUS VERSIONS OF RSTS THERE WAS NO EFFICIENT WAY FOR A SINGLE JOB TO SERVICE MANY INTERACTIVE TERMINALS.

2. PSEUDO KEYBOARDS

PSEUDO KEYBOARDS ARE PRIMARILY INTENDED FOR USE BY A BATCH CONTROL PROGRAM. THEY PERMIT INTERACTIVE JOBS TO BE RUN WITHOUT TYING UP A REAL TERMINAL.

3. BINARY OUTPUT

IN V05B IT IS POSSIBLE TO SEND BINARY INFORMATION TO A TERMINAL OR OTHER DEVICE CONNECTED TO THE SYSTEM THROUGH A TERMINAL INTERFACE. ALL CHARACTER FORMATTING (EXPANDING TABS, CASE TRANSLATION, ETC.) NORMALLY PERFORMED BY THE TERMINAL SERVICE IS DISABLED.

4. BINARY INPUT

IT IS ALSO POSSIBLE IN V05B TO RECEIVE BINARY INFORMATION FROM A TERMINAL OR OTHER DEVICE CONNECTED THROUGH A TERMINAL INTERFACE. ALL CHARACTER FORMATTING IS ALSO DISABLED FOR BINARY INPUT MODE.

5. CONDITIONAL INPUT FROM A TERMINAL

IN PREVIOUS RSTS SYSTEMS ANY REQUEST FOR INPUT FROM A TERMINAL DEVICE CAUSED A STALL UNTIL DATA WAS AVAILABLE OR A SPECIFIED WAIT TIME EXPIRED. JOBS WHICH WOULD LIKE TO PERFORM BACKGROUND WORK WHILE SERVICING TERMINALS NEED SOME MECHANISM TO REQUEST INPUT FROM A TERMINAL BUT NOT STALL IF INPUT IS NOT PENDING. THIS CAPABILTY IS PROVIDED IN RSTS/E V05B.

6. 2741 SUPPORT

2741 SUPPORT WAS MENTIONED ABOVE UNDER NEW HARDWARE SUPPORTED.

7. ESCAPE SEQUENCES

MANY NEWER TERMINALS HAVE SPECIAL FUNCTION KEYS WHICH SEND AN ESCAPE SEQUENCE TO THE HOST PROCESSOR. THE SEQUENCE IS AN ESCAPE CHARACTER FOLLOWED BY A SINGLE BYTE FUNCTION OR OPERATION CODE. A NEW FEATURE IS THE TERMINAL SERVICE ELIMINATES THE AWKWARD PROCEDURES WHICH WERE NECESSARY TO RECEIVE ESCAPE SEQUENCES.

E. DEVICE DRIVERS

1. OVERLAPPED SEEK DRIVERS FOR RP03 AND RK DISKS

THE RK11 AND RP11C CONTROLLERS WILL ALLOW SEVERAL DRIVES TO PERFORM SEEK OPERATIONS SIMULTANEOUSLY. SINCE THE CONTROLLER IS NOT BUSY WHILE SEEKS ARE IN PROGRESS, DATA TRANSFERS MAY BE OVERLAPPED WITH THE SEEK OPERATIONS IN PROGRESS ON OTHER DRIVES. DISK SUBSYSTEM THROUGHPUT IS SUBSTANTIALLY INCREASED. OVERLAPPED SEEK DRIVERS FOR THE RK AND RP03 DISKS ARE INCLUDED IN THE STANDARD RSTS/E V05B KITS AND ARE AVAILABLE THROUGH A HIDDEN SYSGEN OPTION. THE OVERLAPPED SEEK DRIVERS HAD NOT BEEN THOROUGHLY TESTED AT THE TIME OF THE V05B CODE FREEZE. THIS IS THE REASON FOR THE HIDDEN OPTION. WE NOW HAVE TOTAL CONFIDENCE IN THE RP03 OVERLAPPED SEEK DRIVER BUT NEED MORE EXPERIENCE WITH THE RK DRIVER. INSTALLATION NOTES OR A SIMILAR PUBLICATION WILL DETAIL THE SYSGEN RESPONSES REQUIRED TO INCORPORATE THESE DRIVERS.

2. CARD READER MODES

PACKED HOLLERITH AND BINARY READ MODES HAVE BEEN ADDED TO THE CARD READER SERVICE. PACKED HOLLERITH MODE COMPRESSES THE 12 BIT CARD CODE TO 8 BITS BUT PERFORMS NO CHARACTER TRANSLATION. BINARY MODE PASSES THE FULL 12 BIT CARD CODE TO THE BASIC-PLUS PROGRAM WITH NO TRANSLATION OF ANY TYPE. THE DEFAULT READING MODE STILL PERFORMS THE STANDARD TRANSLATION TO ASCII USING THE CONFIGURED CARD DECODE TABLE.

3. MAGTAPE MODES

NEW MODES FOR FILE STRUCTURED MAGTAPE OPERATIONS AVOID MANY TAPE REWINDS PREVIOUSLY PERFORMED WHEN A FILE ON MAGTAPE WAS OPENED. MAGTAPE OPERATIONS ARE GENERALLY FASTER AND MORE FLEXIBLE.

4. LINE PRINTER IMPROVEMENTS

AN ANNOYING PROBLEM IN PREVIOUS RSTS SYSTEMS WAS THE HANDLING OF LINE PRINTER OFF LINE CONDITIONS. WHEN A PRINTER WENT OFF LINE THE BUFFERS WERE IMMEDIATELY RETURNED TO THE POOL. THIS RESULTED IN A LOT OF UNNECESSARY REPRINTING. IN V05B THE BUFFERS ARE NOT CLEARED FOR 10 MINUTES TO ALLOW REASONABLE TIME FOR CLEARING OF JAMS AND PAPER CHANGES. PRINTING WILL RESUME WHEN THE PRINTER IS PUT BACK ON LINE.

F. GENERAL

1. LOGICAL DEVICE NAMES

RSTS SYSTEMS HAVE IN THE PAST LACKED ANY MEANS TO ASSIGN LOGICAL NAMES TO PERIPHERAL DEVICES. A BASIC-PLUS PROGRAM HAD TO EITHER USE THE PHYSICAL DEVICE NAME IN FILE OPEN STATEMENTS OR REQUEST THE DEVICE NAME FROM THE USER SO THAT AN EQUIVALENT STRING COULD BE CONTRUCTED. RSTS/E V05B PERMITS ASSIGNMENT OF LOGICAL NAMES TO PHYSICAL DEVICES. BASIC-PLUS PROGRAMS MAY USE LOGICAL NAMES WHEREEVER A DEVICE NAME IS REQUIRED. THE ASSOCIATION OF LOGICAL AND PHYSICAL NAMES IS MADE THROUGH THE "ASSIGN" SYSTEM COMMAND BEFORE THE PROGRAM IS RUN.

DISK PACKS MAY ALSO BE REFERENCED BY PACK ID BY ALL USERS ON THE SYSTEM. THE USER NEED NOT KNOW THE DISK TYPE OR THE PHYSICAL DRIVE NUMBER BEING USED.

2. CONCISE COMMAND LANGUAGE

EACH INSTALLATION MAY DEFINE A UNIQUE SET OF KEYBOARD COMMANDS WHICH RUN THE INSTALLATION'S COMMONLY USED SYSTEM PROGRAMS. A STANDARD TABLE OF CCL COMMANDS IS PROVIDED TO INVOKE DEC SUPPLIED CUSPS SUCH AS PIP AND QUE. THIS TABLE MAY BE USED AS IS, ADDITIONS CAN BE MADE, OR EACH INSTALLATION MAY DEFINE A UNIQUE SET. CCL REDUCES TYPING FOR THE EXPERIENCED USER AND REDUCES TRAINING REQUIRED FOR INEXPERIENCED USERS WHO USE THE MACHINE ONLY FOR SPECIFIC REPETITIVE TASKS.

3. AUXILIARY LIBRARIES

IN RSTS SYSTEMS THE $-SIGN IS USED TO REPRESENT THE SYSTEM LIBRARY ACCOUNT TO AVOID TYPING THE LIBRARY PPN WHENEVER A LIBRARY PROGRAM IS USED. IN RSTS/E V05B THERE ARE THREE ADDITIONAL LIBRARIES WHICH CAN BE REFERENCED BY A SINGLE CHARACTER. THE EXCLAMATION POINT (!) IS USED FOR ACCOUNT [1,3], THE PERCENT SIGN (%) IS USED TO REFERENCE [1,4], AND THE AMPERSAND (&) IS EQUIVALENT TO [1,5]. THE AUXILIARY LIBRARY ACCOUNTS REFERENCED BY THESE CHARACTERS CAN BE CHANGED TO MEET INSTALLATION REQUIREMENTS. THE POUND SIGN (#) CAN ALSO BE USED TO SPECIFY A GROUP LIBRARY OF THE FORM [*,0].

G. SYSTEM FUNCTION CALLS

1. SEND/RECEIVE

A SYSTEM FUNCTION IS PROVIDED IN V05B WHEREBY JOBS MAY COMMUNICATE THROUGH MESSAGE "PACKETS". THIS FEATURE FACILITATES THE CREATION OF ASYNCHRONOUS TASKS TO PERFORM BACKGROUND PROCESSING AND OPENS UP THE POSSIBILITY OF JOB HIERARCHIES. SEVERAL CUSPS (LINE PRINTER SPOOLER, BATCH, QUEMAN, AND ERRCPY) USE SEND/RECEIVE FOR REQUIRED COMMUNICATION.

2. DIRECTORY LOOKUP BY FILE NAME (WITH WILD CARDS)

A NEW FILE DIRECTORY LOOKUP SYS CALL IS AVAILABLE IN V05B. IT PROVIDES A WAY TO CHECK FOR EXISTENCE, PROTECTION, AND FILE SIZE BY FILE NAME. WILD CARDS IN FILE NAMES ARE ALSO HANDLED. THE LOOKUP BY FILE NAME IS FASTER THAN THE OLDER INDEXED LOOKUP SYS CALL OF PREVIOUS VERSIONS.

3. FILE NAME STRING SCAN (WITH WILD CARDS)

THE FILE NAME STRING SCAN SYS CALL HAS BEEN EXPANDED TO HANDLE WILD CARDS AND TO RETURN MORE INFORMATION. THIS ELIMINATES USER CODE REQUIRED TO VERIFY SYNTAX AMD LOCATION OF WILD CARD FIELDS IN FILE SPECIFICATIONS.

4. REASSIGN

A NEW SYS CALL IS PROVIDED TO REASSIGN A DEVICE TO ANOTHER JOB WITHOUT LETTING IT FLOAT FREE FOR ACCESS BY OTHER SYSTEM USERS. THIS CAPABILITY IS ALSO AVAILABLE THROUGH A NEW "REASSIGN" SYSTEM COMMAND.

5. REATTACH

DETACHED JOBS SOMETIMES HAVE REASON TO ATTACH THEMSELVES TO A TERMINAL TO REPORT RESULTS OR WHATEVER. IN PREVIOUS RSTS SYSTEMS THE ONLY WAY THE JOB COULD GET ITSELF ATTACHED WAS TO FIND A FREE TERMINAL AND FORCE THE NECESSARY LOGIN COMMAND STRINGS TO ATTACH ITSELF. THIS IS AN AWKWARD PROCEDURE WHICH IS OBSOLETED BY THE REATTACH SYS CALL IN V05B.

6. TERMINAL CHARACTERISTICS

THE SYS CALL TO SET TERMINAL CHARACTERISTICS HAS SEVERAL NEW FEATURES FOR ADDED FLEXIBILTY. IT WILL NOW ALLOW THE SETTING OF RING CHARACTERISTICS FOR DIAL UP LINES. THIS WAS DONE PREVIOUSLY WITH THE CONFIG BASIC-PLUS PROGRAM. THE CHANGES TO THE RING CHARACTERISTICS TAKE EFFECT IMMEDIATELY RATHER THAN THE NEXT TIME THE SYSTEM IS BROUGHT UP. IT IS NOW POSSIBLE TO SET DH11 LINES FOR 5,6,7, OR 8 DATA BITS AND TO ENABLE DH11 PARITY GENERATION. THERE ARE ALSO SEVERAL MINOR CHANGES TO OTHER TERMINAL CHARACTERISTICS.

H. BASIC-PLUS LANGUAGE FEATURES

1. CVT$$

IN TEXT PROCESSING APPLICATIONS AND IN PROGRAMS WHICH MUST COMMUNICATE WITH HUMANS TYPING ON A VARIETY OF TERMINALS, THERE ARE SEVERAL OPERATIONS WHICH ARE COMMONLY PERFORMED BEFORE ANY ATTEMPT IS MADE TO INTERPRET COMMAND LINES OR OTHER STRING DATA. LEADING, EMBEDDED, AND/OR TRAILING SPACES AND TABS ARE EITHER DISCARDED OR REDUCED TO A SINGLE SPACE. LOWER CASE CHARACTERS ARE CONVERTED TO UPPER CASE. TERMINATORS AND JUNK CHARACTERS SUCH AS RUBOUTS AND NULLS ARE DISCARDED. IN RSTS/E V05B THESE COMMON OPERATIONS CAN BE PERFORMED IN ONE SIMPLE STATEMENT USING THE CVT$$ CONVERSION FUNCTION.

2. STRING$

STRING$ IS A SIMPLE BUT HANDY NEW STRING FUNCTION IN V05B. THE FUNCTION CREATES A STRING OF ANY LENGTH FILLED WITH ANY ASCII CHARACTER. TWO ARGUMENTS SPECIFY THE STRING LENGTH AND THE FILL CHARACTER. STRING$ CAN BE USED TO FILL RECORD I/O BUFFERS WITH SPACES OR NULLS AND WILL FIND SEVERAL USES IN TEXT PROCESSING APPLICATIONS.

3. FILESIZE

FILESIZE IS A NEW MODIFIER USED IN THE OPEN STATEMENT FOR DISK FILES. ITS PURPOSE IS TO PREEXTEND THE FILE TO ANY DESIRED LENGTH. ONE ARGUMENT GIVES THE NUMBER OF DISK BLOCKS TO PREEXTEND.

4. BUFSIZ

IN PROCESSING RECORD I/O FILES IT IS USUALLY NECESSARY TO KNOW THE SIZE OF THE RECORD I/O BUFFER. UNLESS A BUFFER SIZE IS SPECIFIED IN AN OPEN STATEMENT, RSTS/E WILL ASSIGN A DEFAULT BUFFER SIZE DEPENDING ON THE DEVICE TYPE. WHEN LOGICAL NAMES ARE USED FOR DEVICE NAMES, THE BASIC-PLUS PROGRAM CANNOT KNOW THE DEFAULT BUFFER SIZE UNTIL RUN TIME. THE BUFSIZ FUNCTION RETURNS THE ASSIGNED BUFFER SIZE FOR ANY OPEN CHANNEL. ONE ARGUMENT SPECIFIES THE CHANNEL NUMBER.

5. STATUS

THE NEW RSTS/E SYSTEM VARIABLE "STATUS" PROVIDES THE BASIC-PLUS PROGRAM WITH FREQUENTLY NEEDED INFORMATION CONCERNING THE LAST "OPENED" CHANNEL. THE STATUS WORD CAN BE BROKEN DOWN TO GIVE THE INTERNAL HANDLER INDEX, READ/WRITE ACCESS RIGHTS, AND CERTAIN CHARACTERISTICS OF THE DEVICE OPENED (E.G. CHARACTER ORIENTED, RANDOM ACCESS, AND OTHERS).

6. TIME(3) AND TIME(4)

IN PREVIOUS RSTS SYSTEMS THE TIME(1) AND TIME(2) SYSTEM FUNCTIONS RETURNED THE CPU TIME AND CONNECT TIME FOR A JOB. TIME(3) AND TIME(4) MERELY ROUND OUT THIS SET OF ACCOUNTING DATA FUNCTIONS BY RETURNING KILO-CORE-TICKS AND DEVICE TIME USED BY THE JOB.

7. SCALED ARITHMETIC

IN BUSINESS APPLICATIONS, LOSS OF PRECISION INHERENT IN FLOATING POINT CALCULATIONS CAN CAUSE SERIOUS PROBLEMS. INTEGER ARITHMETIC IS EQUALLY UNSUITABLE FOR ACCOUNTING AND BILLING APPLICATIONS. SCALED ARITHMETIC ELIMINATES LOSS OF PRECISION WHILE PRESERVING FLOATING POINT FLEXIBILTY. SCALED ARITHMETIC IS A NEW FEATURE OF THE RSTS/E V05B 4-WORD MATH PACKAGES. THIS ADDITION OBSOLETES THE SLOW 4-WORD DECIMAL MATH PACKAGE PREVIOUSLY AVAILABLE.

SINCE SCALED ARITHMETIC IS AN ADDITION TO ALL OF THE 4-WORD MATH PACKAGES, DECIMAL CALCULATIONS CAN TAKE ADVANTAGE OF THE 11/45 FLOATING POINT HARDWARE. FURTHERMORE, STANDARD SCIENTIFIC FLOATING POINT CALCULATIONS CAN RUN CONCURRENTLY WITH BUSINESS DATA PROCESSING USING SCALED ARITHMETIC.

III. BASIC-PLUS CUSPS

A. NEW LIBRARY PROGRAMS SUPPLIED IN STANDARD KITS

1. BATCH

THIS BASIC-PLUS PROGRAM ADDS BATCH PROCESSING CAPABILTY TO THE RSTS/E SYSTEM. BATCH COMMAND FILES CAN BE CREATED WITH THE STANDARD EDITOR (EDIT) AND QUEUED FOR PROCESSING IN BATCH MODE. BATCH RUNS THE PROGRAMS SPECIFIED IN THE COMMAND FILE BY SENDING APPROPRIATE STRINGS TO A PSEUDO KEYBOARD. FACILITIES ARE PROVIDED WHEREBY BATCH JOBS CAN REQUEST TAPES OR DISKS TO BE MOUNTED AS REQUIRED. BATCH IS A SINGLE STREAM PROCESSOR BUT MULTIPLE COPIES CAN BE RUN IF SEVERAL BATCH STREAMS MUST BE RUN SIMULTANEOUSLY.

2. RUNOFF

RUNOFF IS A FLEXIBLE DOCUMENT PREPARATION PROGRAM. IT PERFORMS LINE JUSTIFICATION, PAGE FORMATTING, KEY WORD INDEXING, PAGE NUMBERING, UPPER AND LOWER CASE CONTROL, AND SIMILAR FUNCTIONS REQUIRED FOR PROCESSING OF DOCUMENTS. FILES INTENDED FOR PROCESSING BY RUNOFF MAY BE CREATED ON AN UPPER CASE ONLY TERMINAL USING ANY EDITOR (E.G. EDIT). AFTER PROCESSING BY RUNOFF THE DOCUMENT CAN BE PRINTED ON AN UPPER AND LOWER CASE PRINTER, 2741, OR ANY SIMILAR DEVICE.

3. DIRECT

THIS CUSP PRINTS DISK DIRECTORIES. IT IS FASTER AND MORE VERSATILE THAN PIP FOR COMMON DIRECTORY LISTINGS. DIRECT CAN BE CALLED WITH ONE OF THE STANDARD CCL COMMANDS.

4. CREF

THE NEW CREF PROGRAM PRODUCES A CROSS REFERENCE LISTING (BY LINE NUMBER AND VARIABLE NAME) OF A BASIC-PLUS PROGRAM. THE CROSS REFERENCE IS HELPFUL IS DEBUGGING LARGE APPLICATIONS PROGRAMS.

5. RESEQ

BY POPULAR REQUEST, A RESEQUENCE PROGRAM IS INCLUDED IN V05B. RESEQ ALLOWS SELECTIVE RENUMBERING OF BASIC-PLUS PROGRAM LINES.

6. COPY

THIS PROGRAM ADDS FAST COPY CAPABILITY FOR DECTAPES, MAGTAPES, AND RK CARTRIDGE DISKS. COPIES CAN BE VERIFIED BY A SECOND PASS COMPARISON AGAINST THE ORIGINAL. COPIES ARE PERFORMED WITH NON FILE STRUCTURED TAPE AND DISK OPERATIONS.

7. DOSPIP

DOSPIP ALLOWS DOS FORMAT DISKS TO BE READ UNDER RSTS/E. FILES MAY BE TRANSFERRED FROM THE DOS DISK TO A RSTS/E FILE OR TO A PERIPHERAL DEVICE. DOSPIP CURRENTLY DOES NOT PERMIT WRITING FILES BACK TO THE DOS FORMAT DISK.

8. DSKINT

IN PREVIOUS VERSIONS OF RSTS/E, DISK PACKS COULD ONLY BE INITIALIZED TO THE RSTS/E FILE STRUCTURE BY THE DSKINT INITIALIZATION OPTION BEFORE THE SYSTEM WAS BROUGHT UP FOR NORMAL TIMESHARING. THE DSKINT CUSP WILL CREATE THE MINIMAL RSTS/E FILE STRUCTURE ON A FORMATTED RK OR RP DISK DURING NORMAL TIMESHARING. IT DOES NOT HAVE THE FORMATTING AND PATTERN CHECKING CAPABILITIES OF THE DSKINT INITIALIZATION OPTION, HOWEVER.

9. UMOUNT

THIS IS A GENERAL UTILITY PROGRAM WHICH PROCESSES DISK MOUNT AND DISMOUNT REQUESTS MADE BY NON-PRIVILEGED USERS THROUGH THE CCL "MOUNT" AND "DISMOUNT" COMMANDS.

10. RJ2780

USED IN COMBINATION WITH THE RSTS/E 2780 PACKAGE, THIS BASIC-PLUS PROGRAM HANDLES THE TRANSMISSION AND RECEPTION OF FILES TO AND FROM THE REMOTE COMPUTER SYSTEM. RJ2780 CAN ACT AS A SPOOLER WORKING ON QUEUED REQUESTS IN TURN. DATA FILES RECEIVED FROM THE REMOTE SYSTEM CAN ALSO BE REQUEUED TO THE LINE PRINTER SPOOLER FOR PRINTING.

11. QUE, QUEMAN, SPOOL

EARLY VERSIONS OF QUE AND THE LINE PRINTER SPOOLER WERE INCLUDED IN THE COMMERCIAL EXTENSION PACKAGE. THESE PROGRAMS HAVE UNDER-GONE MAJOR REVISIONS AND THEY ARE NOW DISTRIBUTED AS PART OF THE STANDARD RSTS/E V05B KITS.

QUE ALLOWS USERS TO ENTER JOB REQUESTS FOR SUBSEQUENT PROCESSING BY ONE OF THE SPOOLERS. CURRENTLY, PRINTER REQUESTS (FOR ANY LINE PRINTER SPOOLER), BATCH REQUESTS (FOR ANY BATCH STREAM), AND 2780 JOBS MAY BE QUEUED FOR ASYNCHRONOUS PROCESSING. QUE DOES NOT MANIPULATE THE SYSTEM QUEUE FILE BUT SENDS MESSAGES TO QUEMAN WHICH IS A GENERAL QUEUE MANAGING PROGRAM. QUE IS SUFFICIENTLY GENERAL TO ALLOWING QUEUING FOR USER WRITTEN SPOOLERS.

QUEMAN IS A GENERALIZED QUEUE MANAGER FOR ALL SPOOLERS. IT HANDLES ACTUAL QUEUING OF REQUESTS BASED ON MESSAGES RECEIVED FROM QUE. QUEMAN IS ALSO RESPONSIBLE FOR SENDING JOB INFORMATION TO THE SPOOLERS ON REQUEST AND DEQUEUING COMPLETED JOBS.

SPOOL IS THE LINE PRINTER SPOOLER. IT REQUESTS AND PROCESSES PRINT JOBS. SPOOL WILL PRINT JOB AND FILE HEADERS WITH BLOCK LETTERS, AND HAS MULTIPLE COPY, DELETE AFTER PRINTING, AND RESTART CAPABILITIES.

V. DOCUMENTATION

A. SYSTEM MANAGER'S GUIDE

THE RSTS/E SYSTEM MANAGER'S GUIDE HAS BEEN COMPLETELY REWRITTEN. WE HAVE REORGANIZED THE CHAPTERS, ADDED DETAILED INFORMATION ABOUT THE SYSTEM GENERATION QUESTIONS, INCLUDED SYSGEN EXAMPLES, GATHERED ALL INFORMATION ABOUT THE INITIALIZATION CODE OPTIONS INTO ONE CHAPTER, EXPANDED THE DESCRIPTIONS OF THE LIBRARY BUILD PROCEDURES, AND ADDED ADDITIONAL INFORMATION ON SYSTEM FUNCTION CALLS AND PRIVILEGED SYSTEM PROGRAMS.

B. BASIC-PLUS LANGUAGE MANUAL

SINCE ALL PROGRAMMING ON RSTS/E IS IN BASIC-PLUS, ALL THE NEW SOFTWARE FEATURES ARE AVAILABLE TO BASIC-PLUS PROGRAMS. MAJOR ADDITIONS HAVE BEEN MADE TO THE BASIC-PLUS MANUAL TO DESCRIBE THE DETAILS FOR USING THE NEW FEATURES.

C. SYSTEM USER'S GUIDE

THE USER'S GUIDE HAS BEEN EXPANDED TO INCLUDE INFORMATION ON THE NEW CUSPS AND TO IMPROVE THE DECRIPTIONS OF OLDER ONES.

D. RUNOFF MANUAL

THE RUNOFF MANUAL IS A NEW MANUAL FOR RSTS/E V05B. IT PROVIDES DETAILED INFORMATION ON THE PREPARATION OF TEXT FILES FOR PROCESSING BY RUNOFF. OPERATIONAL DETAILS FOR USING THE RUNOFF PROGRAM ARE ALSO INCLUDED.

VI. SOFTWARE PACKAGES

A. 2780 PACKAGE

THE 2780 PACKAGE IS NEW FOR V05B. THIS PACKAGE EMULATES THE OPERATION OF THE IBM 2780 MODEL 1 DATA TRANSMISSION TERMINAL. THE PACKAGE PERMITS THE RSTS/E SYSTEM TO COMMUNICATE WITH ANY IBM SYSTEM WHICH SUPPORTS THE DEVICE, OR WITH ANOTHER RSTS/E 2780 SYSTEM. OPERATION OF THE PACKAGE REQUIRES EITHER A DP11 OR DU11 SYSNCHRONOUS LINE INTERFACE AND THE KG11 COMMUNICATIONS ARITHMETIC OPTION. THE PACKAGE IS SOLD AND SUPPORTED AS AN ADD ON TO THE RSTS/E SYSTEM BY THE DEC COMMUNICATIONS GROUP. IT IS NOT INCLUDED IN THE STANDARD RSTS/E KITS.

VII. OLD PROBLEMS FIXED

A. THERE WERE SEVERAL PROBLEMS IN V05-21 WHICH WERE CORRECTED FOR THAT RELEASE BY PATCHES. THE CHANGES HAVE BEEN MADE FOR V05B. THESE INCLUDE:

1. A STRING GARBAGE COLLECTION PROBLEM WHICH CAUSED THE FIRST FILE NAME IN A PIP DIRECTORY LISTING TO BE GARBLED.

2. UNDER CERTAIN CONDITIONS WRITE PROTECTED FILES WERE DELETED WHEN AN ACCOUNT WAS ZEROED.

3. A FATAL SYSTEM I/O FAILURE WOULD OCCASIONALLY OCCUR IN AN ATTEMPT TO OPEN A FILE ON MAGTAPE IF THE FILE WAS PHYSICALLY LOCATED AFTER SEVERAL LARGE FILES.

4. EXECUTION OF A READ STATEMENT WOULD PRODUCE UNEXPLAINABLE "OUT OF DATA" ERRORS. PROBLEM WOULD NOT RECUR IF THE PROGRAM WAS RERUN.

5. MEMORY MANAGEMENT VIOLATIONS WOULD RESULT FROM PRINT USING STATEMENTS WITH CERTAIN FORMAT STRINGS.

6. PRINT USING WOULD NOT CORRECTLY ROUND CERTAIN NEGATIVE NUMBERS.

7. A DIMENSION STATEMENT WITHIN A FOR LOOP ON THE SAME LINE AS A NEXT STATEMENT DID NOT WORK.

8. THE GET CORE COMMON STRING SYS CALL WOULD RESULT IN A "MAXIMUM CORE EXCEEDED" ERROR IF CORE COMMON WAS READ BEFORE IT WAS WRITTEN.

9. DATES STORED IN DIRECTORIES AND LABELS ON DECTAPE AND MAGTAPE WERE INCORRECT AFTER APRIL 4TH, 1974. THIS WAS DUE TO SIMPLE FIELD WIDTH PROBLEM.

10. THE N COMMAND IN EDIT DID NOT WORK CORRECTLY. THE CHANGE WAS INCORPORATED INTO THE VERSION OF EDIT DISTRIBUTED WITH V05B.

B. INACCURACIES IN THE EVALUATION OF SEVERAL FUNCTIONS FOR SMALL NUMERICAL ARGUMENTS WERE CORRECTED IN V05B.

C. IN PREVIOUS VERSIONS OF RSTS, THE ACCOUNTING DATA (SPECIFICALLY CPU TIME AND KILO-CORE-TICKS) OVERFLOWED THEIR FIELDS IN CORE AND ON DISK WITHIN A VERY SHORT TIME. THE RESULT WAS LOSS OF VALUABLE ACCOUNTING INFORMATION. THE FIELDS HAVE BEEN EXPANDED IN V05B TO AVOID OVERFLOW FOR APPROXIMATELY ONE WEEK OF CONTINUOUS SYSTEM OPERATION. PROVIDED THE ACCOUNTING DATA IS READ AND RESET AT LEAST ONCE PER WEEK, THERE SHOULD BE NO LOSS OF ACCOUNTING INFORMATION.

D. IN V05-21 CONTROL/U DID NOT ALWAYS REMOVE THE WHOLE LINE. THIS WAS CORRECTED FOR V05B.

E. IN SOME CASES, DIVIDE BY ZERO ERROR PROCESSING CAUSED A STACK PROBLEM IN THE RUN TIME SYSTEM. THIS COULD RESULT IN MEMORY MANAGEMENT OR MAXIMUM CORE EXCEEDED ERRORS.

F. LARGE COMPUTE BOUND JOBS WHICH OCCUPIED ALL OF USER MEMORY AVAILABLE ON THE MACHINE COULD PUT THE SYSTEM IN A STATE WHERE NO OTHER JOB WAS GIVEN ANY CPU TIME. THIS WAS DUE TO A SCHEDULER PROBLEM IN V05-21.

G. WHEN KEYBOARD BUFFERS WERE FULL, TYPING A LARGE NUMBER OF RUBOUTS WOULD CAUSE A SYSTEM CRASH.

H. THERE WERE SEVERAL CASES WHERE LEGAL CHAINING BETWEEN PROGRAMS WAS NOT PERMITTED.

I. IF AN ERROR OCCURED IN A FUNCTION WHICH WAS CALLED FROM A SUBROUTINE, THE RUN TIME SYSTEM DID NOT CORRECTLY HANDLE THE RESUME FROM ERROR HANDLING CODE AND THE SUBSEQUENT SUBROUTINE RETURN. THIS COULD RESULT IN LOSS OF THE PROGRAM IN MEMORY.

J. UNDER CERTAIN CONDITIONS, THE I/O BUFFER ALLOCATOR IN THE BASIC-PLUS RUN TIME SYSTEM DOES NOT COMPARE DISPLACEMENT ADDRESSES CORRECTLY WHEN A BUFFER IS DEALLOCATED. THIS PROBLEM IS FIXED BY A PATCH TO V05B.

K. IN A BASIC-PLUS OPEN STATEMENT, AN ATTEMPT TO ALLOCATE A VERY LARGE I/O BUFFER (ON THE ORDER OF 15K) CAN RESULT IN A NON-CLOSEABLE CHANNEL. THE RESULT IS A DANGEROUS CONDITION WHERE AN I/O REQUEST WILL CAUSE A SYSTEM CRASH. THIS IS FIXED BY A PATCH TO V05B.